CHROMOSOME STUDIES IN HABENARIA

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The family Orchidaceae has received attention from numerous authors who have been interested in economic utilization of various taxa but less attention has been given to naturally occurring forms in temperate zone floras. Correll (1950) considered the family and its distribution north of Mexico in North America, and recognized twenty-six species, seventeen varieties and two hybrid taxa in the genus *Habenaria*. When more local treatments are considered it is noted that the number of taxa decreases and also that there is not complete unanimity concerning nomenclature. Thus, Fernald (1950) recognized twenty-six species, twelve varieties, four hybrids and four forms in the genus in north-eastern North America. Essentially the same taxonomic treatment was given by Donly (1963) and by Roland and Smith (1966), these latter describing ten species, five varieties, one form and one hybrid for the Atlantic provinces of eastern Canada.

Cytologically, the genus *Habenaria* has received only limited attention. Earlier reports included the work of Humphrey (1932, 1933 and 1934) and Harmsen (1943). Darlington and Wylie (1955) reported on only two of the local species and followed the earlier nomenclatural system in which the genus was split into at least seven genera (Rydberg, 1932, reprinted 1965). Subsequently only occasional reports have been published (Ornduff, 1967 and Löve, 1968). The present study was undertaken to determine the cytological nature of Nova Scotian species of the genus *Habenaria*.

The materials studied were collected chiefly in Queens County of Nova Scotia, but with scattered collections also from Kings, Antigonish and Inverness counties. Voucher specimens may be found in the herbarium of the Biology Department, Acadia University. Collections were made in the summers of 1964 and 1965, consisting of inflorescences,

root-tips and young shoots according to the conditions of the plant at time of collection. Where possible the three types of material were collected from the same plant. Materials were fixed in Farmer's fluid (three parts absolute alcohol to one part glacial acetic acid) for a maximum of twenty-four hours, after which they were transferred to seventy percent alcohol and stored under refrigeration. Root-tips and shoots were hydrolyzed in one normal hydrochloric acid for three minutes and then squashed in aceto-carmine. Flower buds were dissected and the pollinia smeared in aceto-carmine.

The chromosome numbers of twelve taxa of the genus *Habenaria* in Nova Scotia were determined (see Table I), with the numbers 42 and 84 being noted in somatic material. Of these, the numbers for *H. fimbriata* and *H. flava* have not been previously reported while the other counts confirm reports by Humphrey (1932, 1933, 1934) and Harmsen (1943). However, the count of $2n = 84$ for *H. hyperborea* is noteworthy. Humphrey had reported $2n = 42$ and Harmsen reported $2n = 84$ for this taxon. The latter

Table I. Chromosome numbers in the genus *Habenaria*

Taxon	$2n =$	previous record
× *H. Andrewsii* White ex Niles	42	42
H. blephariglottis (Willd.) Hook	42	42
H. clavellata (Michx.) Spreng.	42	42
H. dilatata (Pursh) Hook.	42	42
H. fimbriata (Ait.) R. Br.	42	
H. flava (L.) R. Br.	42	
H. Hookeri Torr.	42	42
H. hyperborea (L.) R. Br. var. *huronensis* (Nutt.) Farw.	84	42, 84
H. lacera (Michx.) Lodd.	42	42
H. orbiculata (Pursh.) Torr.	42	42
H. psycodes (L.) Spreng.	42	42
H. viridis (L.) R. Br. var. *bracteata* (Muhl.) Gray	42	42

author commented that the lower count is found in the more southerly part of the range of this species. Since Nova Scotia differs but little from Minnesota in latitude (where Humphrey obtained his material) and has milder winters, it might be questioned whether Harmsen's conclusion is valid. A study of material from a wider geographic area should elucidate this problem. The present study indicates that the somatic number of 42 is widespread in this genus.

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